

TUBERCULOSIS OF THE TESTICLE.¹

EPIDIDYMECTOMY; GRAFTING OF THE VAS DEFERENS INTO THE GLOBUS MAJOR.

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IN inviting your attention to tuberculosis of the testicle, I do so for two reasons, first, because a paper upon this subject has not been presented before this Society for the past five years or more,—and, as it is one of growing importance, I trust this imperfect presentation may not come amiss,—and, second, the emphasis given to the subject in my own mind by a case recently under my care, of which the following is the history.

Mr. G. A. E., aged twenty-seven years. Referred to me by the late Dr. Rundlett, January, 1904.

Family History.—Father died at forty-seven, from kidney trouble; had only one kidney. Mother living, sixty-three; tall, thin, nervous, anæmic. Sister, aged thirty-six years; same constitution as mother; has tuberculosis of one lung. Brother, aged thirty-eight years; same general type. In fair health.

Previous History.—Had a first attack of gonorrhœa in 1897. It was very severe. Acute inflammation lasted for two months; this was followed by left epididymitis of four weeks' duration. Recovery was gradual, but not complete for one year. In 1899 he was operated upon in the Philadelphia Polyclinic for a left varicocele caused by wearing a truss twelve years for hernia. Good recovery.

In 1900 a second attack of gonorrhœa occurred. This also was very severe, and was followed by a right epididymitis which lasted six weeks. Recovery was very slow and never complete.

In 1901 had a probable recurrence of gonorrhœa which was not severe. Cured apparently in six weeks. Epididymitis did not follow.

¹ Read before the New York Surgical Society, January 25, 1905.

In 1902 there was another slight attack of gonorrhœa. He was circumcised and operated upon for hernia with good recovery and satisfactory results.

In 1903 had a slight discharge from urethra, but this soon stopped. There remained, however, a slight gumming of the meatus and strings in the urine. He was treated by four different persons for seven months, and the condition was the same at the end of that time as at the beginning.

Present History.—January 31, 1904. Tall, thin, anæmic, narrow-chested man. No tubercular evidences anywhere except in the left testicle, in which the epididymis was hard and nodular. Neither the vas nor testicle itself were indurated. The nodule was tender to pressure but not very painful. The right testicle and epididymis were apparently normal. Rectal examination showed the prostate somewhat enlarged, smooth, and not sensitive. No enlargement of the seminal vesicles. Urination was a little more frequent than normal, and often there was burning in the urethra or at the neck of the bladder. The urine showed some mucus and strings floating through it, and by the microscope a moderate amount of pus, streptococci, but no gonococci or tubercle bacilli.

Diagnosis.—Tuberculosis of left testicle, probably confined to the epididymis.

Treatment.—Castration. Recovery satisfactory.

Microscopical examination of the specimen showed the nodules to be tubercular. The slight urethral discharge disappeared, and did not return until his marriage on May 10, 1904.

A painful, hard nodule appeared in the tail of the epididymis of the remaining testicle in April, 1904. This became worse after marriage. The urethral discharge became more free, so that half a drachm would run from the urethra on standing, after sitting, or lying. It was thin and whitish in color. The microscopical examination showed only streptococci. The disease in the right testicle spread slowly, the swelling and induration extending into the body of the epididymis and for two inches along the vas.

The patient was put upon supportive treatment, ichthyol ointment applied to the scrotum, and in June he was sent to the Maine woods. Soon after his arrival there the urethral discharge ceased, and the swelling and tenderness began to diminish in the testicle.

On September 12, 1904, Mr. E. returned to this city with his general health much improved. The local condition also showed decided improvement. The testicle itself and cord seemed normal, but there was a small, hard, and tender nodule about three-quarters of an inch in diameter in the globus minor. The nodule did not seem to be connected at all with the testicle proper.

On September 15, assisted by Dr. Pisek, after the usual antiseptic and preoperative preparations, this operation was performed.

The scrotum was anesthetized by injecting a 1 per cent. solution of cocaine transversely near its perineoserotol and inguinoserotol junctions. The testicle and cord were exposed through a two-inch incision. The cord was fully infiltrated with this weak cocaine solution. The vas was isolated and severed opposite the globus major. The patient did not know when it was divided. The upper end of the vas was caught in the surrounding tissues with fine forceps, the lower end clamped. The globus minor and body of the epididymis were dissected free from the testicle to the globus major, severed between a clamp and ligature, and removed. No nodule could be felt in the testicle. An incision into the tunica albuginea showed apparently normal testicular structure. This incision was closed by fine catgut. Then the globus major was incised, and the end of the vas tucked into the small cut and fastened there by one stitch of No. 0 ten-day chromic catgut. No attempt was made to close up the opening in the tunica vaginalis, as a large part of it had been removed. The wound was dressed with a wick of catgut and closed by the same suture material.

A small artery evidently came to life after a few hours, and a considerable hæmatoma developed in the scrotum. This was early cleaned out, and the wound healed throughout, so that within two weeks the patient was out of doors.

Dr. Ewing's report on this specimen is as follows: "There are no definite signs of tuberculosis in any of the three portions of tissue examined. Stains for tubercle bacilli in the sections were also negative. In the main mass of the epididymis, however, some of the vessels show considerable numbers of round cells in their sheaths, and this may indicate an early stage of a tubercular process, but it is too slight to permit a diagnosis of tuberculosis."

As we know, however, that the other testicle was distinctly

tuberculous, and this one had every clinical symptom of the disease, there is no doubt in my mind that the process was a tubercular one, and that we were fortunate enough to remove it entire before the later tubercular changes had occurred. The report is especially valuable in confirming what is generally accepted at the present time, viz., that the beginning of the disease is in the blood-vessels, as infection is usually through them.

A month after the operation the patient reported that he was feeling fine. "Seem to have normal sexual power, and there is no pain in scrotum." Returned to the Maine woods for the winter.

November 2, 1904, I received the following report: "General health is excellent. Sexually I am all there, just the same as ever, not a particle of difference in any perceptible way." He wrote on December 11 that his "general health was good. He was strong, active, and had good sexual power. The testicle has greatly decreased in size and is now about as large as a walnut. There are no definite sore places anywhere, but occasionally an ache in the cord. There are no bladder or urethral symptoms." A specimen of semen was forwarded, in which, after being centrifuged, no spermatozoa were found. Consequently the anastomosis attempted failed in this patient.

That such an anastomosis with a patent canal is possible is proved by the result obtained in a case operated upon by Edward Martin (*New York Medical Journal*, October 10, 1903). His case was one of sterility due to double obliterative epididymitis. He grafted the vas into the tail of the epididymis. In spite of infection and suppuration, the operation succeeded, and, later, normal seminal fluid was obtained. Afterwards his wife became pregnant, and the girl baby born presented a striking resemblance to the father.

Pathology.—Tubercular disease of the testicle in the adult begins, as a rule, in the epididymis. Originating in the globus minor, it invades, by continuity of tissue, the body and globus major of the epididymis, then the vas and the testicle itself. In thirteen cases operated upon by J. B. Murphy (*Journal of the American Medical Association*, November 10, 17, 24, December 1 and 8, 1900) for genital tuberculosis, the disease

was limited to the epididymis, and the testicle not involved in any. In one case the cord and seminal vesicle were also involved. Orville Horwitz (*Journal of the American Medical Association*, June 21, 1902) found in ninety-six cases operated by himself that the disease was primary in the epididymis forty-eight times, in the testicle twenty-seven times, and in the remaining twenty-one cases in other regions than the epididymis or testicle. Von Büngner (*Beiträge für klinischen Chirurgie*, Band xxxv, Heft 1) finds the epididymis usually involved first, then the vas next, the testicle, the prostate, and seminal vesicles only very infrequently.

Etiology.—The path of infection is usually by way of the blood-vessels, and the arteries to the epididymis present, according to Saltzmann (quoted by Horwitz), an anatomical arrangement predisposing to the development of tuberculosis here, for the spermatic artery divides opposite the epididymis, and the vessels to that organ are smaller and more tortuous than those to the vas or testicle, and the blood-stream in the vessels of the epididymis is therefore slower. The condition plus some slight traumatism predisposes to the arrest of the tubercle bacilli at this point. Involvement by way of the lymphatics is very rare, but possible. Descending infection through the vas is not considered now to be as frequent a path of invasion as through the blood-vessels; but that it is possible, aside from the opinion of many writers, the experimental production of tuberculosis of the epididymis by Delli Santi (*Riforma Medica*, Vol. xix, No. 28, 1903) establishes this contention. He was able to produce tubercular epididymitis in the dog by injecting tubercle bacilli into the urethra. It was necessary, however, to produce a pathological condition by ligating the spermatic veins and produce venous stasis in the organ. The control animals not injured did not develop tuberculosis.

The predisposing factors may be briefly summarized as follows:

Age. About thirty, when the glands are most active.

Heredity. Possibly shown in those cases developing in infancy.

Traumatism. This, whether slight or severe, probably plays a very pronounced part in locating the disease in the epididymis, as already explained, by the normal arrangement of the blood-supply.

Previous gonorrhœa. Murphy attributes to gonorrhœal epididymitis or posterior urethritis the most important predisposing factor in the subsequent development of tuberculosis of the epididymis and testicle. Paul Thorndike (*Boston Medical and Surgical Journal*, July 3, 1902), in reporting seventy-five cases, found gonorrhœa to be an immediate cause in twenty-five. E. Haas (*Beiträge für klinischen Chirurgie*, Band xxx, Heft 2) assigns to gonorrhœa a causative action in only 5 per cent. of his cases.

The disease is usually unilateral, the right more frequently involved than the left. In only a very small proportion of cases ($3\frac{1}{2}$ per cent., Haas) is the disease bilateral, although, whichever testicle is involved first, the other is soon affected in 38 per cent. of cases (Haas).

The pathological changes in brief are but the repetition of tubercular processes elsewhere. The structures first involved are the intertubular connective tissues of the epididymis. The other structures are gradually implicated by the extension of the process by a continuity of tissue. Discrete tubercular nodules later become fused together. They remain such or undergo caseous degeneration, form an abscess which may remain encysted, burrow, or discharge externally by one or several sinuses. The vas, tunica vaginalis, mediastinum testis, the seminal vesicles, and prostate may become involved.

The progress of the disease is slow or rapid, depending upon the general health of the individual and the absence or presence of mixed infection.

Signs and Symptoms.—The signs and symptoms appear insidiously and progress slowly, unless there be very poor health and a mixed infection, when the onset may be sudden and the course rapid and violent.

The first symptom is usually a feeling of weight and discomfort in the testicle, some tenderness of the part affected,

seldom developing into pain until the disease has lasted quite a considerable time. The pain then felt is dull, aching; may extend up the cord to the groin or even, be felt in the back. These sensations are usually intermittent, disappear on rest to return on exercise. The first sign of the disease is the appearance of a hard nodule at the lower part of the epididymis, usually of slow but progressive growth. This nodular induration later involves the entire epididymis, then the vas for a varying distance, and, lastly, the testicle itself. A small hydrocele may be present. A urethral discharge usually exists, varying in quantity and character; usually small in amount, thin and milky, but may be profuse, purulent, or bloody. This discharge promptly disappears after removal of the tuberculous nodule.

The vesical symptoms are usually late in appearing and are not urgent. There may be merely irritability of the bladder, marked by discomfort and burning attending the frequent micturition, or there may be severe pain, tenesmus, and even strangury. The more severe symptoms, however, do not appear when the disease is limited to the testicle. The urine rarely gives positive evidence of the disease. When tubercle bacilli are found in the urine the disease has passed far beyond the epididymis. Caution should be used in looking for the tubercle bacilli not to mistake the smegma bacillus for the one sought. Pus, blood, and mucus will usually be present in the urine, but these are not pathognomonic of the disease in question.

If the local lesion is not removed early the disease involves the entire epididymis, the nodules soften, break down, fluctuate, and the purulent contents may burrow into the tissues of the scrotum, or more often open spontaneously by one or more sinuses, which may discharge for months.

The general symptoms are those attending a tubercular process anywhere, and vary with the activity of the genital lesion, and whether there are other centres of infection, as consumption, hip disease, etc., or not.

The sexual function is usually preserved.

Differential Diagnosis.—Tuberculosis of the testicle has to be differentiated from simple infections, gonorrhœal or syphilitic inflammations, and benign or malignant growths of the organ. The time does not admit of a further consideration of these affections.

Horwitz advocates the use of tuberculin as a test for tuberculosis, and in doubtful cases it should be employed.

Treatment.—The formulation of the best course to be followed in a given disease is based partially on theory, but much more on practice. Theory is valuable, practice is essential to any correct conclusions. Therefore let us first review the results obtained by different operators with various methods.

E. Albert (*Therapie der Gegenwart*, January, 1900) denounces castration for tuberculosis of the epididymis. He restricts operative treatment to incision and evacuation of the nodules, and claims that castration is not required in tuberculous epididymitis, or else the disease has extended to the seminal vesicles and castration is useless.

L. Louguet (*Revue de Chirurgie*, January, 1900) advises early interference. He limits himself, however, to evacuating the abscess, curetting and cauterizing the cavity or searing it with very hot water. He claims that the "results surpass expectation in cases thus treated." He further states that castration is useless to check the spread of the disease.

In *Annales des Mal. Org. Gen.-Urin.*, Paris, June, 1902, Bodanowicz advocates the injection of camphorated naphthol in amounts varying from a few drops to one cubic centimetre. This proved efficacious in two cases out of six. The method is limited to those cases where pus is present. This is first aspirated and then the injection made. The method is too uncertain to be used when there are so many better ones.

Von Bruns (*Centralblatt für Chirurgie*, July 20, 1901) gives a summary of the results in 111 cases of castration for the past fifty years, performed at Tübingen; 46 per cent. of unilateral castration were cured from three to thirty-four years; 56 per cent. of bilateral castration were cured from

three to thirty years. One-half of *all* castrated patients were permanently cured. In all these cures the tubercular process was restricted to the genital organs. When the process involved the urinary system all have died.

P. Maüclair (Press Medical, September 22, 1900) treats genital tuberculosis by double ligature of the spermatic cord and excision of the included portion. The testicle soon establishes collateral circulation with the neighboring parts. The advantages claimed are the isolation of the tubercular focus and retention of the testicle for its physiological function in maintaining sexual power. He claims this method may prevent infection of the remaining testicle, which is not usually secured by castration.

Von Büngner (*Beiträge zur klinischen Chirurgie*, Band xxxv, Heft 1) claims continued success with his method of treating tuberculous testicles by avulsion of the vas high up through a high external incision for castration. He states that four-fifths of the vas can be thus removed. Horwitz condemns this procedure in vigorous terms as unsurgical and dangerous, and claims several serious hæmorrhages have followed the operation.

Von Büngner also advocates injection into the vas of a 10 per cent. solution of iodoform in glycerine, three to four grammes being injected upward and half this quantity downward. He has treated eighteen cases by his so-called method of "high castration" for tuberculosis restricted to the testicle and vas alone, supplementing this by the iodoform injection when he thought the entire tract was involved. As a last resort, he resected the entire tract, but this is very seldom necessary. He claims a total of 86.6 per cent. cures by his method, as contrasted with 46 per cent. of cures in unilateral and 56 per cent. in bilateral castration reported by Von Bruns; 66 per cent. of cures obtained by Simon in ninety-two cases, and 26 per cent. of cures in forty-five cases that Kocher treated.

The various methods—castration, avulsion, ligature and resection, incision and drainage—have their advocates. The

method of avulsion in connection with castration is too unsurgical and dangerous to be advocated. Incision and curetting are not a radical treatment for this disease in the early stage when cure is possible, although it may be useful as a palliative method later. Injection is of doubtful utility and a waste of time because it cannot by any possibility reach to and destroy all the diseased area, and postpones any other operation when delay is dangerous. Resection of the spermatic cord after double ligature, according to the statements of the originator, Mañelaira, promises much, but its ultimate value is yet to be determined. A serious objection is that the diseased focus is not excised and remains as a menace to the individual. Castration is not followed by the brilliant results one would expect from so radical an operation. And it is especially objectionable where both testicles are involved, as impotency will follow. The psychological state dreaded by some writers after double castration seems not to have much basis in fact, and therefore does not play much of a part in our judgment as to the value or not of castration *per se*. But the loss of sexual function after double castration is sufficient in itself to cause most patients to put off the operation to such a distant time that no operation will be curative.

What have we then to offer our patients? Namely, this: A partial or complete epididymectomy with high resection of the vas, as first performed by Murphy in 1894; or epididymectomy with a grafting of the vas into the remaining portion of the epididymis, as attempted by Lilienthal in 1900 (personal communication), without, however, forming a patent canal, but with cure of the disease; or excision of the epididymis with a grafting of the vas into the rete testis or commencement of the conus vasculosi, as performed by Rasumowski in 1902 (*Archiv für klinische Chirurgie*, Band lxxv, Hefte 3 and 4), who operated on four patients with retention of the sexual function.

Judging from the results obtained by Murphy (thirteen cases), Willy Meyer (*ANNALS OF SURGERY*, Vol. xxx, p. 649) (one case), Howard Lilienthal (personal communication)

(one case), and myself in the one here reported, the results from epididymectomy are more favorable than the best results obtained from castration, for in twenty epididymectomies there were only two deaths, one from probably tubercular kidney and the other from spinal disease. This gives 90 per cent. of cures. There was no extension of the disease in any of the cases to the portion of the testicle left behind, to the seminal vesicles, or to the prostate, and in only one to the kidney, and one to the spine, both of which died. In two cases of excision of the epididymis, in which the other testicle had been previously removed by castration, and in all cases where both epididymi had been removed at the same or different times (seven cases), the sexual function was preserved. While to the surgeon this fact may have small weight in influencing his choice of castration or epididymectomy, to the patient it is the one great argument that decides him in favor of an early operation, a curative procedure, and the retention of his manhood, as against a late and imperative castration of doubtful final utility, with loss of the sexual function.

The much-dreaded psychological state following double castration occurs so very infrequently that we can disregard this possibility entirely. If it has any weight, it certainly is on the side favoring the conservative procedure.

Whether we shall attempt an anastomosis or not between the vas and the remaining part of the epididymis or testicle is a question to be settled for each individual case. In spite of the failures in tubercular cases, such anastomosis has been successfully performed in one instance of double obliterating epididymitis from gonorrhœal origin (Martin, *New York Medical Journal*, October 10, 1903), and there is no especial reason why it should not succeed in tubercular disease limited to the epididymis with improved technique.

It will take several years and numerous operations to finally decide the question. At all events, we are fully justified in performing epididymectomy to castration in the usual form of tubercular testicle, and in attempting an anastomosis of the remaining portions of the vas and testicle, providing these parts are free from tubercular disease.